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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,907	03/31/2004	Brian Lee Lawrence	139955	9290

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
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EXAMINER

VAN ROY, TOD THOMAS

ART UNIT PAPER NUMBER

2828

DATE MAILED: 02/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/815,907	Applicant(s) LAWRENCE ET AL.	
	Examiner <i>T. Van Roy</i> Tod T. Van Roy	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>03/31/2004</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 29-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Makio et al. (US 6047010).

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With respect to claims 29-30, Makio discloses an apparatus comprising: means for producing a laser beam (fig.1 #12), wherein said laser beam comprises electromagnetic radiation substantially within a particular wavelength range (inherent); and means for varying the wavelength range of said laser beam (col.3 lines 10-12); wherein the wavelength is variable within the blue region of the electromagnetic spectrum (col.4 lines 35-36).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-14, and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makio in view of Cox et al. (US 2003/0086466) and Matsumoto et al. (US 6295305).

With respect to claim 1, Makio teaches an apparatus comprising: a laser cavity (fig.1), wherein said laser cavity comprises two mirrors (fig.1 #3, #7), at least one filter (fig.1 #5) and a plurality of crystals (fig.1 #4, 6), said at least one filter comprises a birefringent filter (fig.1 #5), at least one of said plurality of crystals comprises a Colquiriite crystal (fig.1 #4, col.4 lines 32-26), and at least one of said plurality of crystals comprises a nonlinear crystal (fig.1 #6, col.5 lines 35-40), and at least one electromagnetic radiation source being coupled to the laser cavity (fig.1 #1), wherein said at least one electromagnetic radiation source is capable of providing electromagnetic radiation having an approximately particular wavelength to said laser cavity (inherent). Makio does not teach the use of an additional mirror to form a lambda configuration, or the use of an etalon. Cox teaches a laser cavity with a laser crystal and nonlinear crystal arranged substantially in a lambda configuration (fig.1). Matsumoto teaches a laser cavity with a laser crystal and nonlinear crystal wherein the use of an etalon with a birefringent filter is taught (fig.1). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the apparatus of Makio with the lambda configuration of Cox in order to reduce polarization dependent losses due to second harmonic light returning to the gain medium (Cox, [0041-45]), as well as the etalon of Matsumoto in order to provide for a very exact single mode operation (Matsumoto, col.4 lines 6-31).

With respect to claims 2 and 9, Makio further teaches the at least one electromagnetic radiation source comprises a laser diode emitting at 670nm (col.5 lines 49-57).

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With respect to claim 3, Makio further teaches the apparatus to emit radiation within approximately the blue region of the EM spectrum (col.4 lines 32-36).

With respect to claims 4-6, Makio further teaches one of the crystals to be configured to alter the wavelength of the radiation source to approximately half of the wavelength (col.4 lines 32-36).

With respect to claim 7, Makio further teaches the filter to be configured to filter at least a portion of the electromagnetic radiation altered by at least one of said plurality of crystals, wherein the at least one filter is adjustable (via the thickness, col.5 lines 1-5).

With respect to claim 8, Makio further teaches one of the crystals to be Coloquiriite and have a wavelength range of approximately 750-850nm (col.4 lines 32-36), and the second crystal to be LBO (col.5 line 35) and have a wavelength range of approximately 375 to 425nm (col.4 lines 32-36).

With respect to claim 10, Makio further teaches the use of a dielectric mirror (fig.1 #7, mirrored dielectric coating), wherein said dielectric mirror has at least approximately a particular reflectivity (inherent).

With respect to claim 11, Makio further teaches the birefringent filter to be made of quartz (col.4 lines 47-48).

With respect to claim 12, Makio further teaches the filter to comprise 3 plates (given as option influencing wavelength selection, fig.3).

With respect to claims 13-14, Makio further teaches the filter is adjustable by altering the orientation of the one or more plates (col.5 lines 1-5, fig.3, i.e. adding or removing the plates from the system, and angle) which can change the wavelength by

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fractions of a nanometer (fig.3 shows wavelength can be controlled to within fractions of a nm).

Claim 23 is rejected for the reasons given above in the rejection of claims 1 and 14.

Claim 24 is rejected for the reasons given above in the rejection of claim 8.

Claim 25 is rejected for the reasons given above in the rejection of claim 3.

Claims 26-27 are rejected for the same reasons given above in the rejections to claims 12-14.

Claims 15 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makio in view of Cox, Matsumoto and Saikawa et al. (J. SAIKAWA ET AL "VOLUME HOLOGRAPHIC MEMORIES BY USING TUNABLE FREQUENCY-DOUBLED ND-YAG MICROCHIP LASER", 1999 WEE, PP. 1179-1180).

With respect to claims 15 and 28, Makio, Cox, and Matsumoto teach the apparatus as outlined in the rejection to claim 7, but do not teach the apparatus to be used in a holographic data recording system. Saikawa teaches a laser harmonic generation system which is used to record holographic data. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the apparatus of Makio, Cox, and Matsumoto with the data recording of Saikawa in order to take advantage of large data storage capacities (Saikawa, lines 1-3).

Claims 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makio in view of Cox.

With respect to claims 16-17, and 21, Makio teaches a method of generating a laser beam comprising: providing energy to a first lasing crystal (fig.1 #11), wherein said first crystal produces electromagnetic radiation in response to said provided energy (fig.1 beam output from #4), filtering at least a portion of the EM radiation produced by said first crystal (fig.1 #5), altering the wavelength of at least a portion of said filtered EM radiation by passing it through a second crystal (fig.1 #6); and providing a blue output laser beam (fig.1 #12, col.4 line 36), wherein said output laser beam comprises at least a portion of said altered EM radiation and at least a portion of said filtered EM radiation. Makio does not teach making multiple passes through the second crystal. Cox teaches a laser cavity with a laser crystal and nonlinear crystal arranged substantially in a lambda configuration (fig.1) that would pass radiation at least twice through the second crystal. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the apparatus of Makio with the lambda configuration of Cox in order to reduce polarization dependent losses due to second harmonic light returning to the gain medium (Cox, [0041-45]).

With respect to claim 18, Makio further teaches providing 670nm light to the laser crystal (col.5 lines 49-57), and the lasing crystal to produce radiation in the red to near infrared region (col.4 lines 32-36).

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With respect to claim 19, Makio further teaches filtering a portion of the red to infrared radiation (fig.1 #5), such that the radiation passing through the filter is of a smaller wavelength range.

Claim 20 is rejected for the same reasons given above in the rejection to claim 6.

Claim 22 is rejected as being inherent (blue radiation is inherently of approximately a particular wavelength).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

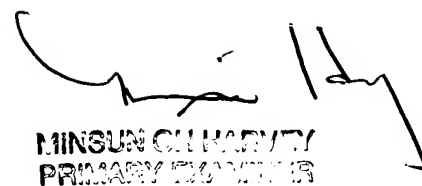
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TVR


MINSUN CHU HAN/TY
PRIMARY EXAMINER